ASCeNews Quarterly Newsletter

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June 2009

The Meisner Minute

I'd like to take a moment in this quarter's issue to congratulate Lawrence Livermore National laboratory (LLNL) for their success in dedicating the National Ignition Facility (NIF) and the early delivery of the Dawn supercomputer. What a great day for simulation at the forefront of science! The dedication of both these capabilities in the same week is symbolic of not only the effort required to do modern science, but also that it's happening at our laboratories.

The Dawn dedication celebrated both the delivery of Dawn and the promise it brings of being able to run problems that challenge the limits of the previous Purple machine as "capacity" jobs on the recent Sequoia system. Similarly, NIF, the world's largest and highest-energy laser system, has captured the imagination of many because of its potential to make a difference in our scientific understanding of extreme conditions present in the explosion of a nuclear weapon.

High-performance computing supplied by the ASC program has been critical to NIF's development. ASC resources have been used extensively to do numerical simulations that presage the first ignition experiments on NIF. Dawn, a 500 teraFLOPS machine delivered in April, has been dedicated for most of the month of May and into June to an unprecedented laser plasma interaction calculation that simulates beam propagation of one entire NIF beam over its full path length within an ignition target.

Development of massively-parallel multi-physics simulation codes by the ASC program enables experimental design and optimization of diagnostics on the NIF. Computational physicists from Sandia and Lawrence Livermore National Laboratories are co-developing a high-energy density physics (HEDP) simulation code to support design work on the NIF and other HEDP facilities. This joint model was outlined in the ASC National Code Strategy and represents an unprecedented approach to national simulation tool development.

The Roadrunner petaflops supercomputer, is also being used to further the NIF objectives. Los Alamos is working to understand the behavior of laser-plasma instabilities from first principles. These calculations employ the VPIC particle-in-cell kinetic plasma simulation code, which has been modified to use the Roadrunner supercomputer very efficiently, and are among the largest of their type ever done. With Roadrunner, it is possible to model laser particle interactions in three dimensions under realistic NIF conditions with the goal of guiding future Inertial Confinement Fusion (ICF) experiments.

These are just a few examples of the critical role that high performance computing has played in bringing NIF to this threshold and the implications of future impacts that our inter-dependent successes will have on science.

"Dawn" of a New Era for Computing Partnership

The partnership that has dominated high-performance computing (HPC) for more than a decade was celebrated last week in a ceremony dedicating the Advanced Simulation & Computing (ASC) Program's latest supercomputer, Dawn.

The dedication in the Terascale Simulation Facility, at Lawrence Livermore National Laboratory (LLNL), was attended by representa-

Dimitri Kusnezov, director of NNSA's Office of Research and Development for National Security, Science and Technology, lauded the accomplishments of the Livermore ASC Program.

tives from the National Nuclear Security Administration (NNSA), the three national weapons laboratories, Lawrence Berkeley National Laboratory, and IBM.

Dignitaries who attended the Dawn dedication pose in front of the recently installed supercomputer in the Terascale Simulation Facility after the ceremony.

Bruce Goodwin, principal associate director for Weapons and Complex Integration (at LLNL), served as host and opened the dedication by noting that the partnership with IBM is being renewed for a fourth time since 1996, when what is today the ASC P rogram was launched. ASC unites the national security HPC expertise of Lawrence Livermore, Los Alamos, and Sandia national laboratories.

"Blue, White, Purple, and BlueGene/L preceded Sequoia and have maintained American pre-eminence in high-performance computing and been central to preserving America's nuclear deterrent. This has been key to avoiding global war," Goodwin told dignitaries packed in the Armadillo Theater May 27. "These advanced computers and the exquisitely detailed science applications that run on them are a sure sign to any potential adversary and to our friends that the American deterrent is alive and well."

Dimitri Kusnezov, director of NNSA's Office of Research and Development for National Security, Science and Technology, lauded what the Livermore ASC program has accomplished thanks to "leadership, vision, and partnership."

"We're not here today about this machine (Dawn). This ceremony is not about the hardware; it's about the people here. It's about the leadership, the vision, the partnership, and the willingness to take on the challenges that the country faces," Kusnezov said. "It's about thinking beyond yourselves and delivering things that are 'serial number one.' These systems are the enablers of innovation. Ultimately, this is a tool for people who think beyond themselves."

Livermore has played an important role in the development of HPC, not only for national security, but for the broader scientific community as well, Kusnezov said. "We've relied in hard times on institutional commitment and George Miller [director of LLNL] has helped the ASC Program immensely. It takes institutional commitment to help push high-end computing in the broader scientific community. It takes vision and leadership to think beyond just the program lines and to commit the institution to thinking bigger."

Director George Miller said Dawn is the latest in a series of machines that have produced breakthrough science. "It's important to step back and look at what we've accomplished. In 2005, we celebrated the dedication of Purple and BlueGene/L and almost immediately we saw incredible things happen. For example, Purple was the first national user facility for NNSA," Miller said. "Purple has been used to do some incredible laser plasma physics calculations that will lead us to the first ignition experiments at the National Ignition Facility. It has truly been a workhorse for the Complex."

The results of an early high-resolution calculation on Purple led to a "discovery no one had anticipated" and resulted in the creation of the Thermonuclear Burn Initiative within the weapons program, Miller said, adding, "I'm expecting no less of those of you who are working on Dawn now."

John Kelly III, senior vice president and director for IBM Research, called the dedication a "huge milestone" that is emblematic of the partnership among Livermore, NNSA, and IBM. "It's the result of decades of investment by IBM, the national labs and DOE. The result is something that was really unimaginable just a few years ago."

"We in IBM research view ourselves as being essentially the last great industrial research lab in the world," Kelly said. "We take that not only as an honor but also as a tremendous responsibility. We realize that as strong as we are, we cannot do it ourselves. We need to partner to be able to do the kinds of things we're celebrating today."

Kelly said IBM is "very proud" of the partnership, which "stands out as an example of how things need to be done in the world of the future and as the model for innovation moving forward."

Also speaking during the ceremony were Rodney Adkins, senior vice president of Development and Manufacturing IBM Systems and Technology Group and Alice Williams, manager of NNSA's Livermore Site Office (LSO). "It stretches the imagination to think of what future discoveries are waiting when the science teams from the three laboratories are let loose on this resource," Williams said.

Dawn is a 500-teraFLOPS (trillion floating operations per second) IBM machine of the same lineage as BlueGene/L, which held the title of the world's fastest supercomputer for three and one-half years (November 2004–May 2008). Delivered to LLNL in January, Dawn (an IBM Blue Gene/P system) will lay the applications foundation for multi-petaFLOPS (quadrillion floating operations per second) on Sequoia, a 20-petaFLOPS IBM system to be delivered in 2011.

Both systems are part of NNSA's "Sequoia procurement" contract with IBM, which builds on the 12-year partnership that has produced two Livermore HPC systems (White, BGL) that have been ranked as the world's fastest supercomputers by the Top500, widely regarded as the computing industry standard for measuring computing power.

Looking to the future, Kusnezov said, "Simulation remains a keystone in our national security enterprise. In the year to come, as we try to rethink the role and portfolio of national security activities for which the NNSA is responsible, simulation will remain a centerpiece of everything we do."

Lawrence Livermore Hosts Predictive Science Panel; Expanded Charter Focuses on Improved Predictivity

The twice-a-year review of the ASC Program by the Predictive Science Panel (PSP) was held at Lawrence Livermore National Laboratory March 31 through April 2 to evaluate progress toward the goal of a credible predictive capability. Although the PSP has been evaluating ASC for years, this is the first time the meeting was held with the new expanded charter—to review what experimental data are being acquired and how they are being integrated into improved predictivity of the codes. As a result, the PSP has an expanded purview that now encompasses both ASC and its connection with the Science Campaigns. The original charter was more directly focused on ASC alone.

From the new charter, dated February 2008, the following clarifications were made to the PSP role during their ASC reviews:

- Obtaining key data, the integration of experimental data, and the validation of the models in the major weapons codes are key elements in increasing confidence in the simulations.
- The panel will also examine the integration between experimental programs conducted under the Science Campaign and the development, verification, and validation of the simulation tools. The panel will review the validation and discovery processes driven by the data, obtained both in aboveground experiments and through studying and re-analyzing the archival nuclear test data.

From the executive summary of the PSP report, "The Panel was extremely impressed by the work presented to us. We saw world-class science and what is surely world-class application of it to nuclear weapons." Technical presentations delivered at the meeting were organized into these technical categories:

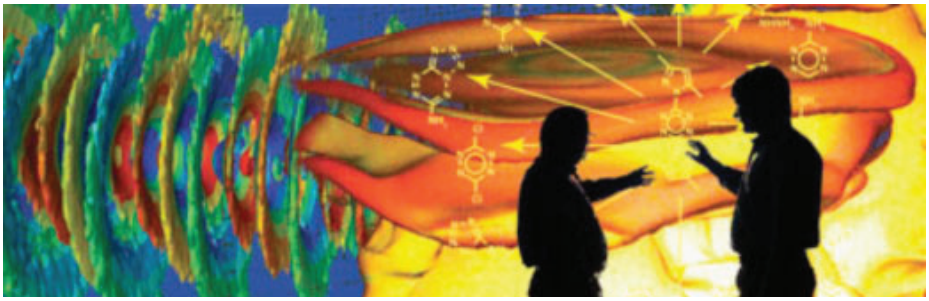
- Advanced certification
- National Boost Initiative
- Sequoia
- Experimental science

The next PSP will be held in the fall of 2009 at Los Alamos National Laboratory.

Los Alamos (LANL) Hosts 2009 Weapons Science Capability Review

The third annual meeting of the Weapons Science Capability Review was held this Spring at Los Alamos National Laboratory (LANL) in which the Weapons Physics Directorate hosted an external committee of reviewers to assess the quality of science, technology, and engineering within capabilities supporting

weapons science. The ASC Program was well represented at this three-day meeting.



LANL ASC Program Director John Hopson noted the successful Roadrunner project and the new advanced computing alliance with Sandia National Laboratories to site a new major computing machine called ZIA. Bill Archer, Integrated Codes Program Manager, reviewed LANL's work to develop a code framework to capture the key algorithms commonly used in weapons performance codes while providing for future application and model development. Roadrunner Project Director Andy White gave an overview of the Roadrunner hardware, the open-science investigations being executed to prepare for full-scale operations, and the new paradigm for programming that is required on the heterogeneous architecture.

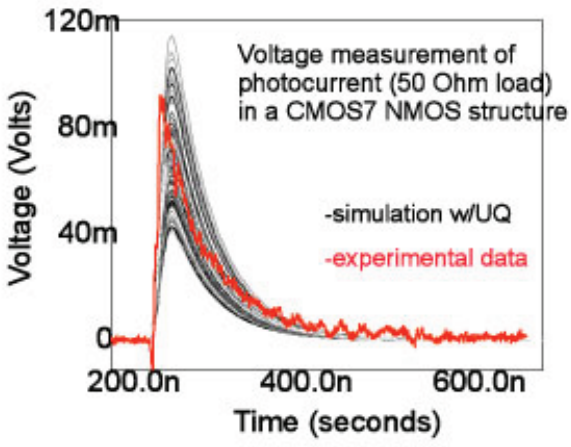
Paul Henning, R&D Scientist at LANL, talked about the significant effort going on in compiler development, operating system design, and other core computer science activities required to address the heterogeneous platforms and develop programming models for future hardware. Henning reported that Los Alamos is participating in important alliances with vendors as well as academia and has established centers that will focus on advanced architectures. R&D Scientist Tim Germann introduced an LDRD project that couples integration of large-scale parallel molecular dynamics simulations with the accelerated molecular dynamics algorithms.

The Weapons Science Capability Review Committee concluded:

> The new Roadrunner hardware achieved its goal of exceeding the petaFLOP level of computing capability and progress is being made to adapt this capability to weapons science. These are significant achievements in a complex and challenging multiyear effort.

— May 2008

New RAMSES Simulation Software Tested to Assess Its Predictive Capability



In a joint ASC and Campaign 7 activity, a first-of-its-kind validation study was performed to assess the predictive capability of new features in Sandia's RAMSES software. These new RAMSES capabilities were added to better assess weapon electrical circuit vulnerability to hostile X-ray and gamma-ray radiation environments. This study focused on electrical circuits constructed utilizing Sandia's CMOS7 (complementary metal-oxide semiconductor) manufacturing process, which was used in the W76-1 life extension program and may be used in future weapon applications.

The results of a validation study showing an ensemble of circuit response simulation data from the RAMSES simulation software, versus test data obtained from a linear accelerator facility.

Campaign 7 funded a custom electrical circuit using ~90 thousand transistors, and then test the circuit in an Air Force linear accelerator facility. ASC funded coupling of RAMSES with Sandia's DAKOTA software to execute the 800+ RAMSES runs needed for the uncertainty propagation and validation portion of this study. Each RAMSES run simulated the electrical response of the circuit to the radiation pulse produced by the accelerator, and the total set of RAMSES runs covered a wide range of uncertainties in the circuit model parameters (see figure below). Additional studies are under way in FY09 to quantify the uncertainties in both the simulation data and the test data so as to develop a quantified measure of agreement for the data sets.

As a result of this study, new insights were gained into the sensitivity of peak voltage and current values resulting from variations in circuit model and design parameters. This insight has helped explain past observations in tests performed for the W76-1 program and provides new information to designers working on circuits for current and future applications.

Sandia's ASC Program Engages NASA in Risk-Informed Decision-Making Analysis

In late March 2009, a Sandia National Laboratories team visited the NASA Langley Research Center for a technical exchange on a variety of topics related to computational simulations and their use in risk-informed decision making. For the initial two days of the meeting, Sandia staff delivered a tutorial on sensitivity analysis and uncertainty quantification (UQ) methods, which was attended by 70 NASA staff, managers, and resident graduate students. These training materials were developed under the Verification and Validation (V&V) program element of Sandia's ASC Program.

One of the discussions during this exchange centered on NASA's recently published standard practice guide on the use of computational simulation tools in high-consequence applications. Over the past several years, representatives from the NNSA tri-laboratory community contributed to this document via technical discussions with NASA technical staff and managers. Currently, discussions are under way between Sandia and NASA staff to determine how some of Sandia's expertise in UQ methods can be leveraged by NASA teams involved in aerodynamic performance assessments of new spacecraft launch vehicles.

Enhanced Verification Test Suite Completed for Physics Simulation Codes

A tri-lab team has completed a multiyear effort to identify and develop verification test problems to assess the numerical performance of models and algorithms implemented in ASC codes. The purpose of the verification analysis is to demonstrate whether the numerical results of the discretization algorithms in physics and engineering simulation codes provide correct solutions of the corresponding continuum equations.

Led by James Kamm, at Los Alamos National Laboratory (LANL), David Cotrell, at Lawrence Livermore National Laboratory (LLNL), and Greg Weirs, at Sandia National Laboratories (SNL), the collaboration culminated in a published report that supplements a 1999 report that documented seven problems. The May 2009 report[1] adds nineteen problems to the original list of seven problems while providing better coverage of hydrodynamics equations, transport processes, and strength of materials. While these test problems are not intended to comprise an exhaustive list, they provide a starting point for a common comparison of simulation codes at the laboratories and elsewhere. The rigor with which simulation codes of the NNSA weapons laboratories are assessed is greatly improved by analyzing code verification test problems. Only the comparison between the exact solutions of these test problems and numerical approximations calculated by a code provides a quantitative evaluation of code quality, credibility, and usefulness.

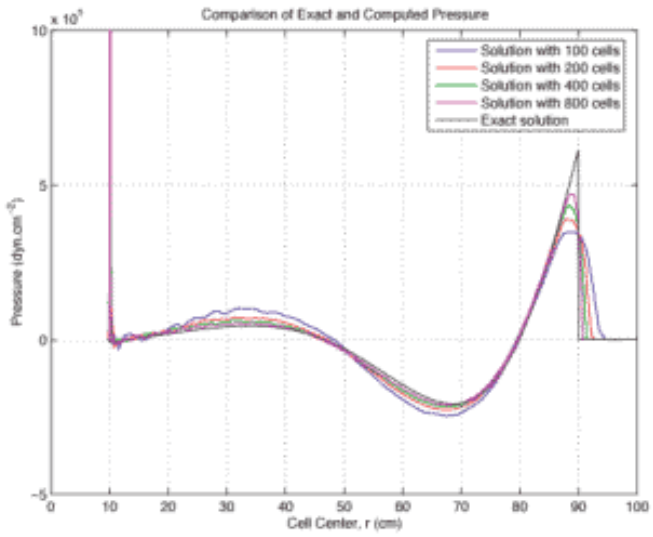
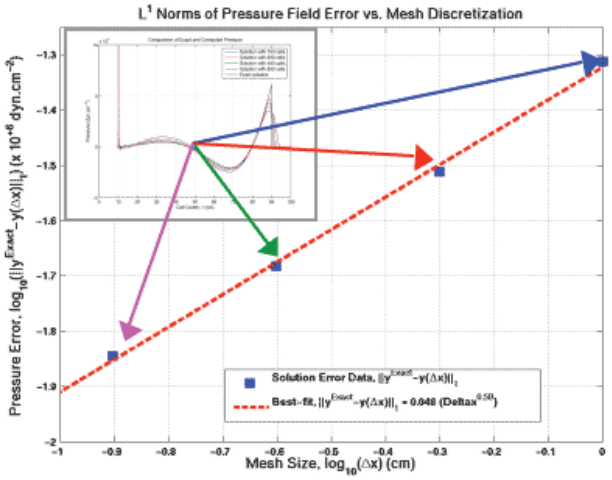


Figure 1. Comparison of exact and discrete solutions from a mesh refinement study.

Figure 1 is a "view-graph" norm comparison between an exact solution and four approximations calculated by an ASC hydrodynamics code at LANL. The four solutions are obtained using coarse- to- fine levels of mesh discretization. To go beyond a qualitative "view-graph norm," errors between the exact and numerical solutions must be calculated, which the second figure shows. Plotting the solution error as a function of mesh resolution indicates the behavior of truncation error. Assessing the behavior of truncation error is important for two reasons. First, it verifies the correctness of an algorithm or



model implementation because, if implemented correctly, then the theoretical order of convergence of the numerical method should be recovered. Second, it provides important insight into which discretization settings are appropriate to simulate a particular phenomenon that may be of interest to code users.

[1] http://library.lanl.gov/cgi-bin/getfile?LA-14379.pdf

Figure 2. Analysis of solution error as a function of mesh resolution in the calculation.

ASC's Seminars at Sandia on Verification, Validation, and Uncertainty Quantification Exceed Attendance Expectations

As of April 2009, the educational outreach efforts of the Verification and Validation (V&V) program element in the Sandia National Laboratories ASC Program have hit an attendance milestone: 1,000+ participants since the start of the educational activities in August 2007. These seminars and workshops have covered a broad array of topics related to computational simulations such as V&V, uncertainty quantification, mathematical optimization, and error estimation. Also included were related topics such as experimental test data uncertainty analysis and quantification of margins and uncertainties (QMU).

To date, there have been 35 seminars, workshops, and training sessions. Attendees have come from across Sandia (30+ centers and 170+ departments) including on-site and video-streamed sessions to Sandia personnel in Livermore and Carlsbad. In addition, a smaller number (~100) of external attendees have come from the NNSA Sandia Site Office, Los Alamos, Lawrence Livermore, the UK's Atomic Weapons Establishment, NASA Langley Research Center, and the Air Force Research Laboratory. These ASC V&V educational activities will continue in FY09 and beyond. In addition, discussions are under way regarding possible integration with formal Sandia training and educational programs.

New Project Team Guides Code Developers to Fully Exploit Sequoia

The massive size and capability of the 2011–2012 Sequoia system presents significant challenges to users and staff.

With the 500-teraFLOPS ASC Dawn system on the computer room floor at Lawrence Livermore National Laboratory, preparation is under way to develop software applications scaled to run on Dawn's successor, Sequoia. Sequoia will be capable of achieving performance levels 20 to 50 times that of BlueGene/L with materials science codes, and application code teams will need guidance to succeed in fully exploiting Sequoia's capability. The Sequoia Scalable Applications Preparation Project (SSAPP) has been initiated by Livermore Computing (LC) to develop and provide the needed guidance for code teams.

A "From Here to Sequoia" seminar was held on March 23 to kick off the SSAPP efforts. Presentations ranged from Sequoia: An IBM Perspective to Dawn 'Getting Started' Pointers. Among the 90+ in attendance were participants from LLNL, IBM, and Sandia, Los Alamos, Lawrence Berkeley, and Argonne national laboratories.

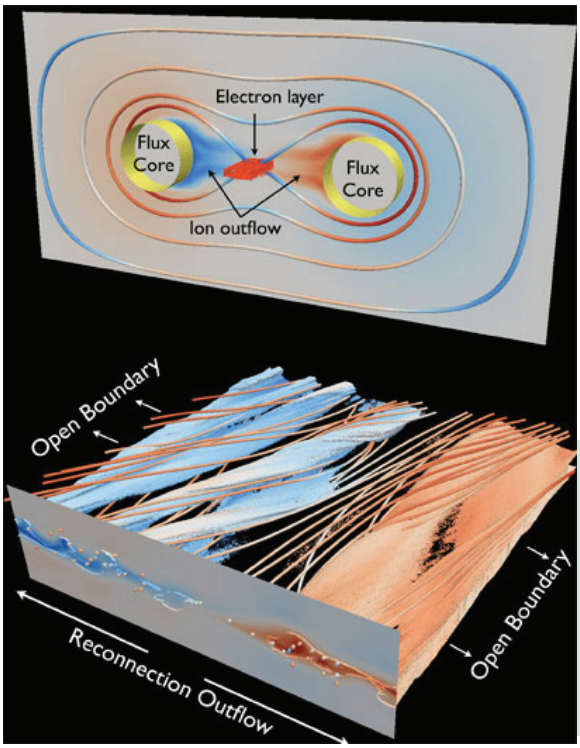
The Sequoia system poses new challenges for code teams. Current BlueGene/L experience informs scalability for Dawn and Sequoia, but the message passing interface (MPI) is not likely to scale to a million+ tasks for most codes, so node-level nested concurrency will be needed. The Sequoia system will

follow the Moore's-Law-driven industry trend of increasing processor core counts per node. Sequoia will also feature new and innovative shared-memory programming technologies beyond traditional locks and threads models, which may offer significant performance benefits. Code teams will want to exploit these alternate means of achieving parallel performance and reducing the MPI task count. The SSAPP is intended to assist code developers with this transition.

As part of the ongoing SSAPP effort, the LC Hotline staff, the Development Environment Group, and the Training and Documentation staff are poised to provide timely information through all stages of the Sequoia project. Expertise in compilers and performance tools will be provided, and IBM experts and on-site IBM applications analysts will provide workshops, training, and application support. Documentation and training will be provided for each stage of development of Dawn and Sequoia—from system build through general availability.

New Scientific Insights on Magnetic Reconnection from Roadrunner Open Science Runs

As mentioned in the March 2009 issue of the ASC eNews, Los Alamos is conducting open-science runs on the Roadrunner petascale supercomputer. One of the science topics under investigation concerns magnetic reconnection, a basic plasma process in which magnetic field energy is rapidly converted into plasma kinetic energy. Understanding these basic structural features will allow researchers to better predict the dissipation rate and time dependence of reconnection for a variety of applications. Initial simulations of magnetic reconnection using the particle-in-cell code, VPIC, are leading to new scientific insights into the influence of plasma instabilities on the 3D evolution of reconnection layers. Go to http://www.lanl.gov/roadrunner/rropenscienceabstracts.shtml to see the abstract for this project "Three-Dimensional Dynamics of Magnetic Reconnection in Space and Laboratory Plasmas." Principal Investigator, Bill Daughton, from the Applied Physics Division at Los Alamos is leading this project.



Preliminary results of two types of plasma instabilities within the electron region of the reconnection layer (top) and the complex 3D interaction of flux ropes (bottom).

Although the team has not yet been able to run at full scale (17 connected units), there has been some limited success at reduced scale for two types of reconnection problems. First, they are employing boundary conditions relevant to the Magnetic Reconnection eXperiment (MRX) to allow direct validation comparisons regarding the kinetic structure of the layer. One 3D simulation of this type at 1/8 of the full-scale has demonstrated a plasma instability within the electron layer, which may play an important role. The second class of problem employs open boundary conditions to model magnetic reconnection in large open systems for application to space and astrophysical plasmas. The graphic and movie show preliminary results of two types of plasma instabilities within the electron region of the reconnection layer and the complex 3D interaction of flux ropes. The team is working to understand the role these instabilities play in setting the dissipation rate and accelerating electrons to high energy. The movie rotates through a particular time slice to show the complex interaction of flux ropes for a reconnection simulation of the "open boundary" type. They are preparing to perform full-scale runs for both of these problems.

LANL Has Golden Opportunity to Prototype New Storage Archive

As archiving requirements for high performance computing (HPC) data grow while resources to maintain specialized archive systems stay the same or decline, a new approach to archiving may be needed. Newly available commercial storage technologies have opened the possibility to prototype an alternative solution to archiving data while minimizing ASC-funded code development and maintenance.

This pilot project uses the General Parallel Filesystem (GPFS) and Tivoli Storage Manager (TSM), both from IBM, with commodity hardware and operating systems. The parallel nature of GPFS and its Information Lifecycle Management feature coupled with the flexibility of the TSM data movement path provide excellent parallelism and scaling opportunities. The filesystem semantics of GPFS and the use of commodity software like MPI, MySQL, and FUSE allow us to address challenges in the solution—parallel copy, tape access efficiency, and huge file migration/recall—with a surprisingly small amount of code written.

This archive solution is being used to support the Open Science runs on the Roadrunner platform. It will eventually be moved to LANL's Turquoise open collaboration environment. For more information, email Cody Scott at cscott@lanl.gov.

Roadrunner, the fastest supercomputer in the world, at Los Alamos National Laboratory is a cluster of 17 Connected Units. For more information, visit http://www.lanl.gov/roadrunner.

Los Alamos Tool Could Improve Checkpoint Bandwidth

The current method for massively parallel applications to protect themselves from component failure is through periodic checkpointing—a process in which applications save their state to persistent storage. Protection from component failure is increasingly important as systems grow in size and the number of components increases. Los Alamos National Laboratory is implementing a tool that will dramatically improve checkpoint performance for many applications.

Following a failure, the applications can resume computation using the last checkpoint state saved. For many applications, saving this state into a shared single file is most convenient. With such an approach, the size of writes are often small and not aligned with file system boundaries. Unfortunately for these applications, this preferred data layout results in pathologically poor performance from the underlying file system, which is optimized for large, aligned writes to nonshared files.

To address this fundamental mismatch, a consortium of researchers has developed a parallel log-structured file system, PLFS, which is positioned between the applications and the underlying parallel file system. PLFS remaps an application's write access pattern to be optimized for the underlying file system. Through testing on Panasas ActiveScale Storage System and IBM's General Parallel File System at Los Alamos and on Lustre at Pittsburgh Supercomputer Center, the researchers have seen that this layer of indirection and reorganization can reduce checkpoint time by up to several orders of magnitude for several important benchmarks and real applications (Figure 1). At Los Alamos, PLFS is currently running on Roadrunner and is being tested on Redtail. See the full report at http://institute.lanl.gov/plfs.

Figure 1: A summary of the results showing that the technique improves checkpoint bandwidths for all seven studied benchmarks and applications by up to several orders of magnitude. See the full report at http://institute.lanl.gov/plfs.

Sandia's DART Workbench Now in Broad Production Use for Model Management

In May 2009 Sandia National Laboratories released version 1.1 of the Design Through Analysis Realization Team (DART) Workbench —DWB, completing a three month "hardening" effort aimed at addressing all critical user issues identified after the initial release in early 2009. Over 200 individuals use a combination of DWB and ESAW (Engineering Sciences Analysis Workbench). New capabilities include fast file uploads, Python scripting, improved integration with Dakota (Jaguar UI), improved integration with Sandia's SIERRA codes (work in progress), job submission support for the new Tri-Lab Capacity Cluster (TLCC) machines, support for client-only mode, and multi-point constraint support for building the Salinas software input decks. Additionally, all known critical and high-priority bugs were addressed as part of this release.

These tools impact the user community via improved information management, with focus on management of model and simulation processes and data in support of computational simulation. They also act as a communication platform for the weapon engineering groups and directly support the weapon safety and reliability technical bases by acting as a repository for full system models, and associated analysis and test work.

Efforts are under way to provide these tools outside Sandia.

ASC Salutes Bob Little

Hardly a newcomer to ASC, **Robert C. "Bob" Little**, from Los Alamos National Laboratory, was selected this spring as Program Manager for the Physics and Engineering Models (PEM) p rogram e lement within ASC. The PEM program develops and implements the theory and models that are incorporated into simulation codes. As well as working especially closely with the Integrated Codes and V&V program elements, the PEM program plays an essential role in working with the experimental campaigns to help motivate and interpret measurements and to utilize measured results to improve models and data bases. Also, high-performance computing simulations sponsored by the PEM program on platforms such as Roadrunner and BG/L are providing exciting insights into the physical processes important to the nuclear weapons (NW) program as well as other areas of interest to the laboratories and the Department of Energy (DOE).

Bob acknowledges the major challenge that is under way to establish the Predictive Capability Framework (PCF) that coordinates computational and experimental efforts. "PEM is a critical centerpiece of the PCF. The PCF cannot be successful without PEM," he says. PCF defines major activities associated with the improvements in predictive capability for stockpile stewardship and coordinates those activities among the ASC, Defense Science, Engineering, and Inertial Confinement Fusion (ICF) campaigns.

Bob already leads two of the PEM projects — the nuclear and atomic projects— and in the past he has led the EOS project. He also leads the work on forensics within ASC. He has previously served as a group leader in Applied Physics (X-) Division and currently serves as deputy group leader of the Nuclear Atomic and EOS Data Section of the Applied Science and Methods Development Group in X-Division. He joined Los Alamos in 1980 and has bachelor's, master's, and doctoral degrees in nuclear engineering from Rensselaer Polytechnic Institute. He is a Fellow of the American Nuclear Society. He received the Los Alamos Fellows' Prize for Leadership, with which he was recognized for his scientific leadership and operation of the Nuclear and Atomic Data Team that provides national and international computational communities with neutron-photon data libraries that are the international "gold standard" and with new Monte Carlo physics models, some of which are dedicated to critical applications in programs at Los Alamos such as the NW program, nuclear nonproliferation, and emergency response. He is a three-time recipient of the DOE Award of Excellence for significant contributions to the NW program.

Bob Little, on the right, accepts from LANL Director Mike Anastasio a large-team distinguished performance award for the National Technical Nuclear Forensics (Attribution) Simulation Team.

Brian Carnes Begins Position as Lawrence Livermore's ASC Deputy Program Leader

Brian Carnes assumed the role of ASC Deputy Program Leader for Lawrence Livermore National Laboratory (LLNL) on April 1, 2009, replacing retiring ASC Deputy Lynn Kissel. Brian also will continue to manage the Multiprogrammatic and Institutional Computing (M&IC) program at LLNL as he has for the past six years. With more than 24 years at LLNL, Brian has spent most of that time in Livermore Computing (LC), serving in various functional and programmatic leadership roles.

"I'm very pleased that Brian was willing to accept this demanding and occasionally thankless position," said ASC Program Leader at LLNL Michel McCoy. "Brian has been a division leader since 2001 and has provided leadership founded on the principle that the LC is here to serve the scientists and science … that this virtue, in itself, will support all the missions. He has done well."

In his new role, Brian will serve ASC in many ways, including management of the numerous little details that keep the program running efficiently for the ASC program and the country.

"I've worked in the ASC Program since it began, and I'm happy to be taking on this important role," said Brian. "I'm looking forward to the challenges it will bring."

"What I've enjoyed most about the Lab and ASC," said Brian, "is that it has offered interesting and challenging career opportunities while still allowing family balance, as summed up in one of my favorite quotes—The hardest thing about juggling career and family is knowing which balls are rubber and which are glass."

Lynn Kissel Retires after 20 Years of Service

At the end of June, ASC Deputy Program Leader Lynn Kissel retires from Lawrence Livermore National Laboratory (LLNL) to pursue his love of vintage cars. Lynn has been with ASC for 10 years and for the past few months has been showing new ASC Deputy Brian Carnes "the ropes."

Lynn first joined LLNL and the Nuclear Test Program in 1977 after receiving his Ph.D. in physics from the University of Pittsburgh. After spending the 1980s at Sandia Laboratories in Albuquerque and returning to the Physics Directorate at LLNL in 1991, he joined Livermore Computing and the Computation Directorate in 1998.

"It's more than appropriate to thank Lynn Kissel for his service as ASC Deputy," said ASC Program Leader Michel McCoy. "Lynn's integrity, diligence, intelligence, gentle humor, and above all, his abiding loyalty to ASC and to me personally will not be forgotten. He will be missed."

NY Times Extols Hyperion Technology

The New York Times featured an article about the Hyperion testbed (an advanced technology cluster testbed) in its Technology section earlier this month. According to the article, "Intel, Dell, Cisco Systems, Sun Microsystems, and others have worked with Lawrence Livermore to create something called the Hyperion testbed. In essence, it's a supercomputer made of thousands of machines dedicated to pushing open source software to its limits and then refining the software for use on future machines built at various national labs."

Mark Seager, assistant department head for advanced technologies at Lawrence Livermore National Laboratory, provided the keynote address entitled "The Challenges and Rewards of Petascale Clusters" at the High Performance Computing Asia and Asia–Pacific Advanced Network 2009 Conference in Kaohsiung, Tawain, in March.

"The conference had very good attendance from the Pacific Rim countries," Mark said."Many of the talks dealt with open science and the impact of global warming, and the technical topics covered a large array of issues, like supercomputing covers. There was also a vendor display area with about 30 vendor booths."

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